Study of the Relationship between Cytotoxicity of Streptococcus Pyogenes and Enzymatic Activities

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Background & Objectives: Streptococcus pyogenes is responsible for a wide range of human disease. It usually produces a range of lytic enzymes that promote bacterial pathogenesis. Different studies show various level of cell death induction by streptococcus pyogenes. The aim of this study was to evaluate any relationship between cytotoxic effect and the enzymatic activities of bacteria.

Methods: The cytotoxic effect of fifteen internalized streptococcal strains, on two types of malignant cell lines-A549 (human respiratory epithelial cell) and BT-20 (human breast epithelial cell) were tested by trypan blue exclusion and WST-1 (based on the cleavage of of tetrazolium salt by mitochondrial dehydrogenases) Methods. Protease, lipase DNase and serum opacity factor (SOF) activities of those strains were tested separately too.

Results: The rate of cytotoxicity was 57% and 97% by trypan blue and WST-1 Methods respectively. The correlation between production of SOF, lipase, DNase and cytotoxicity was not significant ($p > 0.05$). However 67% of the protease positive strains induced cellular death in at least one type of malignant cell lines.

Conclusion: It seemed that among bacterial products, proteolytic enzymes were more related to bacterial invasion.

Keywords: Streptococcus Pyogenes; Protease; Lipase; SOF; Cytotoxicity